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EXAMINER	
PHAN, HANH	
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2613	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/23/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/817,105	AUDIC ET AL.	
	Examiner	Art Unit	
	Hanh Phan	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 1-7 are objected to because of the following informalities:

-In claim 1, line 7, the phrase "the photodiode" should be changed to -- the PIN diode--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 8-10, 16 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

-In claim 8, lines 4 and 5, the phrase "**amplifying the input light signal to produce an output electrical voltage signal**" is unclear.

-Claim 8 recites the limitation **"the PIN input light signal"** in line 7. There is insufficient antecedent basis for this limitation in the claim.

-Claim 8 recites the limitation **"the pre-amplifier"** in line 9. There is insufficient antecedent basis for this limitation in the claim.

-Claim 16 recites the limitation **"the optical amplifier PIN receiver"** in line 2. There is insufficient antecedent basis for this limitation in the claim.

-Claim 17 recites the limitation **"the optical PIN receiver"** in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugawara (US Patent No. 6,057,951) in view of Cornelius et al (US Patent No. 6,522,461).

Regarding claims 1 and 8-10, referring to Figure 1, Sugawara teaches an optical receiver, comprising :

an optical pre-amplifier (i.e., optical fiber amplifier 1, Fig. 1) for receiving an input light signal (i.e., optical input signal, Fig. 1), the optical pre-amplifier (i.e., optical fiber amplifier 1, Fig. 1) employing no carrier filters in the optical pre-amplifier (i.e., col. 1, lines 5-61) ;

a photodiode (i.e., optical detector 2, Fig. 1), coupled to the optical pre-amplifier, for converting the input light signal into an electrical current signal (i.e., col. 1, lines 5-61);

an electrical amplifier (i.e., equalization amplifier 4, Fig. 1), coupled to the photodiode (i.e., optical detector 2, Fig. 1), for amplifying the electrical current signal (i.e., col. 1, lines 5-61); and

a control loop (i.e., peak detection circuit 7, error amplification circuit 9 and gain control circuit 10, Fig. 1), coupled to the amplifier (amplifier 4, Fig. 1), for adjusting the optical signal generated by the pre-amplifier (optical amplifier 1, Fig. 1) relative to the output electrical current signal generated by the amplifier (i.e., amplifier 4, Fig. 1, col. 1, lines 5-61).

Sugawara differs from claims 1 and 8-10 in that he fails to specifically teach the photodiode is a PIN diode and the electrical amplifier is a transimpedance amplifier. Cornelius et al, from the same filed of endeavor, likewise teaches an optical receiver includes an optical pre-amplifier (Figures 1, 2 and 4). Cornelius further teaches the optical receiver comprising a photodiode is a PIN diode (i.e., a PIN diode 560, Fig. 4) and an electrical amplifier is a transimpedance amplifier (i.e., transimpedance amplifier TIA 570, Fig. 4, from col. 3, line 65 to col. 7, line 35). Based on this teaching, it would have been obvious to one having skill in the art at the time the invention was made to incorporate the photodiode is a PIN diode and the electrical amplifier is a transimpedance amplifier as taught by Cornelius et al in the system of Sugawara. One of ordinary skill in the art would have been motivated to do this since allowing providing an optical receiver with high sensitivity and wide dynamic range, and reducing noise signal and cost of the system and providing a current-to-voltage converter is used to condition the signal for proper handling by a controller.

6. Claims 2, 3 and 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugawara (US Patent No. 6,057,951) in view of Cornelius et al (US Patent No. 6,522,461) and further in view of Hatakeyama (US Patent No. 5,517,351).

Regarding claim 2, Sugawara as modified by Cornelius et al teaches all the aspects of the claimed invention as set forth in the rejection to claim 1 above except fails to specifically teach the optical pre-amplifier comprises: a first isolator having an input and an output; a second isolator having an input and an output; a pump laser an input and an output; and an optical multiplexer (mux) having an input coupled to the output of the pump laser and an output, wherein the output of the optical multiplexer is coupled between the output of the first isolator and the input of the second isolator, the first and second isolators being used in order reject pump power generated by the pump laser and avoid optical reflection in the amplifier mean. Hatakeyama, from the same field of endeavor, likewise teaches an optical receiver includes an optical pre-amplifier (Figure 1). Hatakeyama further teaches the optical pre-amplifier comprises: a first isolator (i.e., first optical isolator 1, Fig. 1) having an input and an output; a second isolator 9i.e., second optical isolator 5, Fig. 1) having an input and an output; a pump laser (i.e., pump laser 7, Fig. 1) an input and an output; and an optical multiplexer (i.e., optical multiplexer 3, Fig. 1) having an input coupled to the output of the pump laser (7, Fig. 1) and an output, wherein the output of the optical multiplexer (3, Fig. 1) is coupled between the output of the first isolator (1, Fig. 1) and the input of the second isolator (5, Fig. 1), the first and second isolators being used in

order reject pump power generated by the pump laser and avoid optical reflection in the amplifier mean (i.e., Fig. 1, col. 3, lines 24-67 and col. 4, lines 1-3). Based on this teaching, it would have been obvious to one having skill in the art at the time the invention was made to incorporate the optical pre-amplifier comprises: a first isolator having an input and an output; a second isolator having an input and an output; a pump laser an input and an output; and an optical multiplexer (mux) having an input coupled to the output of the pump laser and an output, wherein the output of the optical multiplexer is coupled between the output of the first isolator and the input of the second isolator as taught by Hatakeyama in the system of Sugawara modified by Cornelius et al. One of ordinary skill in the art would have been motivated to do this since allowing preventing reversal of the incident light and avoiding the optical reflection in the amplifier.

Regarding claim 3, the combination of Sugawara, Cornelius et al and Hatakeyama teaches in backward pumping mode, wherein the optical pre-amplifier comprises an erbium fiber having a west end and east end, the east end of the erbium fiber coupled to the output of the optical multiplexer and the input of the second isolator, the input light signal generating an input light power that propagates in contrary direction relative to a pump light power from the pump laser (i.e. Fig. 1 of Hatakeyama, col. 3, lines 24-67 and col. 4, lines 1-3).

Regarding claim 5, the combination of Sugawara, Cornelius et al and Hatakeyama teaches the control loop comprises a level detector for

generating a level signal relative to the peak or average value of the output electrical voltage signal (i.e., peak detection circuit 7, Fig. 1 of Sugawara).

Regarding claim 6, the combination of Sugawara, Cornelius et al and Hatakeyama teaches wherein the control loop comprises an automatic gain controller for generating a control voltage signal for controlling the level of optical amplification generated by adjusting the current of a pump laser in the optical pre-amplifier (i.e., Fig. 1 of Sugawara, and Fig. 1 of Hatakeyama, col. 3, lines 24-67 and col. 4, lines 1-3).

Regarding claim 7, the combination of Sugawara, Cornelius et al and Hatakeyama further comprising a clock/data regenerator coupled to the transimpedance amplifier for compensating distortion and timing jitter to ensure accurate regeneration of the output electrical voltage signal (i.e., Fig. 1 of Sugawara, and Fig. 1 of Hatakeyama, col. 3, lines 24-67 and col. 4, lines 1-3).

7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugawara (US Patent No. 6,057,951) and Cornelius et al (US Patent No. 6,522,461) and in view of Hatakeyama (US Patent No. 5,517,351) and further in view of Yamamoto et al (US Patent No. 5,710,660).

Regarding claim 4, the combination of Sugawara, Cornelius et al and Hatakeyama differs from claim 4 in that it does not specifically teach a forward pumping mode, wherein the optical pre-amplifier comprises an erbium fiber having a west end and east end, the west end of the erbium fiber coupled

to the output of the optical multiplexer and the output of the first isolator, the input light signal generating an input light power that propagates in same direction relative to a pump light power from the pump laser. Yamamoto et al, from the same field of endeavor, likewise teaches an optical receiver includes an optical pre-amplifier (Figures 2 and 11). Yamamoto et al further teaches a forward pumping mode, wherein the optical pre-amplifier comprises an erbium fiber having a west end and east end, the west end of the erbium fiber coupled to the output of the optical multiplexer and the output of the first isolator, the input light signal generating an input light power that propagates in same direction relative to a pump light power from the pump laser (i.e., Figs. 2 and 11, col. 1, lines 35-67, col. 2, lines 1-65, col. 6, lines 6-65). Based on this teaching, it would have been obvious to one having skill in the art at the time the invention was made to incorporate the forward pumping mode, wherein the optical pre-amplifier comprises an erbium fiber having a west end and east end, the west end of the erbium fiber coupled to the output of the optical multiplexer and the output of the first isolator, the input light signal generating an input light power that propagates in same direction relative to a pump light power from the pump laser as taught by Yamamoto et al in the system of the combination of Sugawara, Cornelius et al and Hatakeyama. One of ordinary skill in the art would have been motivated to do this since allowing increasing the power level of the optical signal to a desired level.

8. Claims 11-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugawara (US Patent No. 6,057,951) in view of Cornelius et al (US Patent No. 6,522,461) and further in view of Shi et al (Pub. No.: US 2005/0031355).

Regarding claim 11, the combination of Sugawara and Cornelius et al teaches all the aspects of the claimed invention as set forth in the rejection to claim 1 above except fails to specifically teach a controller, a transmitter coupled to the controller and a receiver coupled to the controller. Shi et al, from the same filed of endeavor, likewise teaches an optical transponder (100, Fig. 1). Shi et al further teaches the optical transponder (100, Fig. 1) comprises a controller (400, Fig. 1), a transmitter (300, Fig. 1) coupled to the controller (400, Fig. 1) and a receiver (200, Fig. 1) coupled to the controller (400, Fig. 1)(i.e., Fig. 1, page 2, paragraphs [0022]-[0029]). Based on this teaching, it would have been obvious to one having skill in the art at the time the invention was made to incorporate the optical transponder comprises a controller, a transmitter coupled to the controller and a receiver coupled to the controller as taught by Shi et al. in the system of the combination of Sugawara and Cornelius et al. One of ordinary skill in the art would have been motivated to do this since allowing providing an bidirectional optical communication system with high speed and high capacity and reducing the error signals.

Regarding claim 12, the combination of Sugawara, Cornelius et al and Shi et al teaches the control loop comprises a level detector for generating a level signal relative to the peak or average value of the output electrical voltage signal

(i.e., Fig. 1 of Sugawara and Fig. 4 of Cornelius et al, from col. 3, line 65 to col. 7, line 35).

Regarding claim 13, the combination of Sugawara, Cornelius et al and Shi et al teaches the control loop comprises an automatic gain controller for generating a control voltage signal for controlling the level of optical amplification generated by adjusting the current of a pump laser in the optical pre-amplifier (i.e., Fig. 1 of Sugawara and Fig. 4 of Cornelius et al, from col. 3, line 65 to col. 7, line 35).

Regarding claim 14, the combination of Sugawara, Cornelius et al and Shi et al teaches further comprising a clock/data regenerator coupled to the transimpedance amplifier (i.e., Fig. 1 of Sugawara and Fig. 4 of Cornelius et al, from col. 3, line 65 to col. 7, line 35).

Regarding claim 15, the combination of Sugawara, Cornelius et al and Shi et al teaches the optical transmitter comprises an electronic multiplexer having inputs for receiving a plurality of inputs and generating a multiplexed output signal, a driver, coupled to the electronic multiplexer, for driving the multiplexed output signal from the electronic multiplexer and generating a driver output signal: and a modulator, coupled to the driver, for modulating the input light of the modulator (i.e., Fig. 1 of Shi et al, page 2, paragraphs [0022]-[0029]).

Regarding claim 16, the combination of Sugawara, Cornelius et al and Shi et al teaches a demultiplexer coupled to the optical amplifier PIN receiver (i.e., Fig. 1 of Shi et al, page 2, paragraphs [0022]-[0029]).

Regarding claim 17, Sugawara teaches further comprising a coupler (i.e., optical splitter 14, Fig. 9) and a power detector (i.e., output level detection circuit 15, Fig. 9) coupled to the input of the optical PIN receiver (i.e., col. 8, lines 60-67 and col. 9, lines 1-54).

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Grandpierre (US Patent No. 5,854,704) discloses an optical receiver.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hanh Phan whose telephone number is (571)272-3035.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached on (571)272-3022. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-4700.

HANH PHAN
PRIMARY EXAMINER